The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte YAP-PENG TAN
and
TINKU ACHARYA

_____

Appeal No. 2001-1642
Application No. 09/191,310

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ON BRIEF

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Before HAIRSTON, JERRY SMITH, and MOORE, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1-20, which are all the claims of this application.

REPRESENTATIVE CLAIM

The appellants have indicated (Brief, page 6, last line) that, for the purposes of this appeal, the claims will stand or fall together. Consistent with this indication, the appellants have made no separate arguments with respect to the remaining claims. Accordingly, all the claims will stand or fall together,

and we will select claim 1, the broadest independent claim as representative of all of the claims on appeal. Note In re Dance, 160 F.3d 1339, 1340 n.2, 48 USPQ2d 1635, 1636 n.2 (Fed. Cir. 1998); In re King, 801 F.2d 1324, 1325, 231 USPQ 136, 137 (Fed. Cir. 1986); In re Sernaker, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983). It reads as follows:

1. A method of detecting defective sensors in a sensor array comprising:

performing an observation of an object on a sensor array having a plurality of pixels, each pixel corresponding to a sensor of said sensor array and each sensor generating a pixel value for the corresponding pixel;

for each of said pixels, determining a score based on statistical analysis of said pixel values using said observation; and

if said score for said each pixel satisfies a stopping condition, classifying said each pixel as being one of either defective or functional.

The References

In rejecting the claims under 35 U.S.C. § 102(b), the examiner relies upon the following reference:

Ebel et al. (Ebel) 5,717,781 Feb. 10, 1998

The Rejection

Claims 1-20 stand rejected under 35 U.S.C. § 102(b) as being unpatentable over Ebel.

The Invention

The invention relates to a method and apparatus for determining defective pixels within an image sensor by using a sequential analysis of each pixel and comparing it to nearby pixels. (Specification, page 1, lines 4-6). For unclassified pixels, each is given a score based upon an observation, and if the score satisfies a stopping condition that pixel is then classified. The process is repeated for any remaining unclassified pixels (Specification, page 5, lines 2-9).

The Rejection of Claims 1-20 Under 35 U.S.C. § 102(b)

The examiner has found that Ebel discloses a method of detecting defective sensors in an array by performing an observation of an object on a sensor array having a plurality of pixels, each pixel corresponding to a sensor of said sensor array and each sensor generating a pixel value for the corresponding pixel. For each unclassified pixel, Ebel determines a score based upon statistical analysis of the pixel using the observation, and if the score for the pixel satisfies a stopping condition, classifying each pixel as being one of either defective or functional. (Final Rejection, paper #5, page 3, line 15 - page 4, line 2).

The appellants' principal argument is that the "defective pixels" referred to in Ebel do not relate to the sensor array, but

the quality of an ophthalmic lens (Appeal Brief, page 7, lines 17 - page 8, line 2). Although Ebel does recognize that camera defects are present, the digital data which corresponds to the image is corrected for known defects using an algorithm. The appellants contend that it is the lens evaluation procedure, not the detection of defective pixels in the CCD array, that is subjected to the statistical analysis (Appeal Brief, page 8, lines 11-20; page 9, lines 13-21).

After our review of the disclosure of Ebel, we find that we are in agreement with the appellants, and shall reverse the anticipation rejection.

The examiner has stated that Ebel classifies unclassified pixels by determining a score based on statistical analysis of the pixel value using an observation, and if the score for the pixel meets a stopping condition, classifying each pixel as being defective or functional, citing generally to the abstract. (Final Rejection, paper #5, paragraph bridging pages 3 and 4).

However, we find that the examiner has misinterpreted the abstract. Although it refers to "defective pixels," the abstract itself notes that the "defective pixels" are placed into groups and given scores based upon the number, type and severity of the defective pixels placed into that group. "From that, a weighted score can be given to the entire lens and the lens either passes

or fails." (Abstract, last two lines).

It is clear from reading the abstract and the specification, that the term "defective pixels" refers not to the pixels of the CCD device itself, but the image pixels which reflect defects in the ophthalmic lens being observed. See, e.g. Fig. 2, box "Placement of Pixel(s) in Defect Categories"; see also column 3, lines 7-9 "After making these pixel level determinations, each defective pixel is considered for membership in a defect group." Hence, the term "defective pixels."

As set forth in Gechter v. Davidson, 116 F.3d 1454, 1457, 43 USPQ2d 1030, 1032 (Fed. Cir. 1997), "[u]nder 35 U.S.C. § 102, every limitation of a claim must identically appear in a single prior art reference for it to anticipate the claim." "Every element of the claimed invention must be literally present, arranged as in the claim." Richardson v. Suzuki Motor Co., Ltd., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

As the rejection is therefore based upon an error of fact, and the reference as relied upon by the examiner does not determine each "defective pixel" of the CCD device, we shall reverse it. However, we make the following additional observations which should be addressed upon further prosecution.

We compare the claimed method and the prior art Ebel as follows. The invention of claim 1 recites a method of detecting

defective sensors in a sensor array. Column 6, lines 5-7 of Ebel evidences that as a part of its overall method, it detects defective sensors in a sensor array and compensates for them.

In the claimed method the following steps occur, with the corresponding function also noted from the prior art Ebel:

1) performing an observation of an object on a sensor array having a plurality of pixels, each pixel corresponding to a sensor of said sensor array and each sensor generating a pixel value for the corresponding pixel. We note that the observation of the uniform target image of Ebel (column 6, lines 5-7) occurs on the sensor array, which generates pixel values for corresponding pixels. The image is then manually viewed, which indicates that values must be generated in order to generate an image for display purposes.

2) for each of said pixels, determining a score based on statistical analysis of said pixel values using said observation. We observe that in Ebel the manual observation of a region where gray level values deviate unexpectedly reasonably appears to us to reasonably be a form of statistical analysis, as defined by the instant specification. At page 7, lines 18-24, the statistical analysis is described as:

> In the SPRT [Sequential Probability Ratio Test – a statistical analysis] approach an inference is made which attempts to identify one of two hypotheses from a sequence of

> observations. For instance, in the defective pixel detection case, the hypotheses may be the presence of a defective pixel and the presence of a functional pixel. When an adequate number of observations are made, a decision may be arrived at as to which of the two hypotheses fit. That decision may or may not be accurate since it is based upon a statistical approximation.

In the Ebel method, the number of observations is one, but the hypothesis that the row or group of pixels is defective is made by an observation of the row and the surrounding rows to see if an unexpected value is observed. If the unexpectedly high or low value (the "score") is observed, then the decision is made whether the row is defective or not. It may or may not be accurate.

3) if said score for each pixel satisfies a stopping condition, classifying said each pixel as being one of either defective or functional.

The one visual observation, if illustrating a significant unexpected difference or not (a "stopping condition" based on the "score") allows the decision to be made regarding the row of pixels, thus classifying the row as functional or defective.

It thus appears to us that the observation of the image made to determine the CCD baseline in Ebel may anticipate or at least render the claimed subject matter obvious. The appellants and the examiner should consider this alternative interpretation of the disclosure of Ebel and complete the record accordingly.

Summary of Decision

The rejection of claims 1-20 under 35 U.S.C. § 102(b) over Ebel is reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)	
JERRY SMITH Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JAMES T. MOORE Administrative Patent Judge	)	

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